

Work Order ID 87328

87328

Page 1

July-13-12 12:38:24 PM

Item ID: D212-664-101F

Accept

N900040100

Setup

Start

NS1

Revision ID:

Item Name: Crosstube Fwd

Stop

NS2

Start Date: 7/20/12 Start Qty: 1.00

1

Cust Item ID:

Required Date: 7/27/12 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals: Process Plan: MLJ

Date: 12/07/16

Tooling:

Date:

Run

Start

NR1

QC:

Date:

SPC (Y/N):

Date:

Stop

NR2

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

Draw Nbr	Revision Nbr
D212-664-141	Rev D (DEO)

100

100

DC

Document Control

DOCUMENT CONTROL

50

0.00

DAS
16
20/7/16

20/7/16

MLJ 12/07/16

110

110

Packaging

Packaging

Pick Kit

Packaging

Memo

0.00

0.00

JW

12-7-18

120

120

CNC Bend 2

CNC Alpha 160 Bender

BENDING MACHINE - CROSSTUBES

Memo

0.00

0.00

JW

12-7-18

B87328

NCR: Yes / No

WORK ORDER NON-CONFORMANCE / UPDATE

DQA: _____ Date: _____

QA Closed: _____ Date: _____

Work Order: _____	DISPOSITION				AGAINST DEPARTMENT/PROCESS						
Part No. _____	Rework	Skid-tube	Crosstube	Water Jet					Engineering		
NCR No. _____	Scrap	Machining	Small Fab	Prod. Eng. Coor.					Quality		
	Use-as-is	Thermoforming	Finishing	Rec/Store/Packaging					Other		
	Work Order Update	Large Fab	Composite	Supplier							

Root Cause	Date	Step	Qty	Description of work order update or Non-conformance	Initial Chief Eng	Action Description	Sign & Date	Verification	QC Inspector
Doc/Data									
Equip/Tooling									
Operator									
Material									
Setup									
Other									
Process									
Supplier									
Training									
Unapproved									

FAULT CATEGORY

Landing Gear		General									
			Bend		Grain		Ovalized		Pressure/Forced		
			BOM/Route		Hardware		Over/Under tolerance		Temperature/Cure		
			Broken/Damaged		Inspection Incomplete		Part Incorrect		Weld		
			Burrs		Instructions Incomplete/Unclear		Part Lost/Missing		Wrong Stock Pulled		
			Contamination		Maintenance		Part Moved				
			Countersink		Mislabeled		Positioned Wrong				
			Cut Too Short		Misread		Power Loss/Surge				
			Drill Holes		Offset						
			Drawing		Out of Calibration						
			Finish		Out of Sequence						
			Folio		Outside Dimensions						

Work Order ID 87328

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87328

Page 2

Item ID: D212-664-101F

Accept

N900040100

Setup Start

NS1

Revision ID:

Item Name: Crosstube Fwd

Start Date: 7/20/12 Start Qty: 1.00

1

Cust Item ID:

Required Date: 7/27/12 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals:

Process Plan:

Date:

Tooling:

Date:

Run Start

NR1

QC:

Date:

SPC (Y/N):

Date:

Stop

NR2

Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Tool ID

Tool #

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

130

QC15- Crosstube Dimensional Check

0.00

0.00

(DAS
16
2/20/19)

130

QC

Quality Control

140

Crosstubes

0.00

140

Crosstubes

Crosstubes

Memo

0.00

1-Drill pilot holes in tube as per Dwg D212-664-141 using drill Jig DT8548 & DT8549, using drill table DT8577, set-up towers in hole #7 as per QSI 10

2-Ream hole to finish size in tube as per Dwg D212-664-141 using drill Jig DT8548 & DT8549. Check dimensions between holes, both sides on both cuffs, to ensure alignment with saddle holes.

3-Scribe part # and batch # using vibrating stylus as per Dwg D212-664-141

4-Deburr & Inspect for surface damage. Repair damage within limits as per Dwg D212-664-141

MO/12-7-19
RM

JW

12-7-19

NCR: Yes / No

DQA: _____ Date: _____

WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order: _____			DISPOSITION			AGAINST DEPARTMENT/PROCESS																	
			Rework <input type="checkbox"/> Scrap <input type="checkbox"/> Use-as-is <input type="checkbox"/> Work Order Update <input type="checkbox"/>	Skid-tube <input type="checkbox"/> Machining <input type="checkbox"/> Thermoforming <input type="checkbox"/> Large Fab <input type="checkbox"/>	Crosstube <input type="checkbox"/> Small Fab <input type="checkbox"/> Finishing <input type="checkbox"/> Composite <input type="checkbox"/>	Water Jet <input type="checkbox"/> Prod. Eng. Coor. <input type="checkbox"/> Rec/Store/Packaging <input type="checkbox"/> Supplier <input type="checkbox"/>	Engineering <input type="checkbox"/> Quality <input type="checkbox"/> Other <input type="checkbox"/>																
Part No. _____		NCR No. _____																					
Root Cause	Date	Step	Qty	Description of work order update or Non-conformance		Initial Chief Eng	Action Description		Sign & Date	Verification	QC Inspector												
Doc/Data																							
Equip/Tooling																							
Operator																							
Material																							
Setup																							
Other																							
Process																							
Supplier																							
Training																							
Unapproved																							
FAULT CATEGORY																							
Landing Gear				General																			
<input type="checkbox"/> Bending <input type="checkbox"/> Centre Not Concentric to O/S <input type="checkbox"/> Cracks <input type="checkbox"/> Crushed/Crimped. <input type="checkbox"/> Cuffs <input type="checkbox"/> Heat Treat <input type="checkbox"/> Inspection Strip in Tube <input type="checkbox"/> Ripples in Bend <input type="checkbox"/> Torque Waves in Extrusion <input type="checkbox"/> Turning Sequence <input type="checkbox"/> Wave/Twist in Tube				<input type="checkbox"/> Bend <input type="checkbox"/> BOM/Route <input type="checkbox"/> Broken/Damaged <input type="checkbox"/> Burrs <input type="checkbox"/> Contamination <input type="checkbox"/> Countersink <input type="checkbox"/> Cut Too Short <input type="checkbox"/> Drill Holes <input type="checkbox"/> Drawing <input type="checkbox"/> Finish <input type="checkbox"/> Folio								<input type="checkbox"/> Grain <input type="checkbox"/> Hardware <input type="checkbox"/> Inspection Incomplete <input type="checkbox"/> Instructions Incomplete/Unclear <input type="checkbox"/> Maintenance <input type="checkbox"/> Mislabeled <input type="checkbox"/> Misread <input type="checkbox"/> Offset <input type="checkbox"/> Out of Calibration <input type="checkbox"/> Out of Sequence <input type="checkbox"/> Outside Dimensions				<input type="checkbox"/> Ovalized <input type="checkbox"/> Over/Under tolerance <input type="checkbox"/> Part Incorrect <input type="checkbox"/> Part Lost/Missing <input type="checkbox"/> Part Moved <input type="checkbox"/> Positioned Wrong <input type="checkbox"/> Power Loss/Surge				<input type="checkbox"/> Pressure/Forced <input type="checkbox"/> Temperature/Cure <input type="checkbox"/> Weld <input type="checkbox"/> Wrong Stock Pulled			

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Item ID: D212-664-101F

Accept

N900040100

Setup

Start ***NS1***

Revision ID:

Stop

NS2

Item Name: Crosstube Fwd

Start Date: 7/20/12 Start Qty: 1.00

1

Cust Item ID:

Required Date: 7/27/12 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals: Process Plan: _____

Date: _____

Tooling: _____

Date: _____

Run

Start

NR1

QC: _____

Date: _____

SPC (Y/N): _____

Date: _____

Stop

NR2

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
160 *160* QC	QC5- Inspect part completeness to step on W/O Memo	0.00 0.00 (DAS) 16 8-9 7/20/20							
170 *170* Outsource2	Outsource process - NDT per QSI038 4.1 Memo	0.00 0.00							<i>CL 12/10/20 ①</i>
Outsource process - NDT	Liquid Penetrant Inspection as per QSI 038 Issue P/O: <i>12509</i> LPI as per ASTM 1417 Level 2 Attach copy of NDT results to work order								
180 *180* Packaging Packaging	Receive & Inspect for Damage & Mat'l Certs Packaging Memo	0.00 0.00 Ensure copy of NDT results attached to work order.							<i>RJ 12/10/20 ④</i>

NCR: Yes / No

DQA: Date: , ,

WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order: _____			DISPOSITION			AGAINST DEPARTMENT/PROCESS					
			Rework <input type="checkbox"/> Scrap <input type="checkbox"/> Use-as-is <input type="checkbox"/> Work Order Update <input type="checkbox"/>	Skid-tube <input type="checkbox"/> Machining <input type="checkbox"/> Thermoforming <input type="checkbox"/> Large Fab <input type="checkbox"/>	Crosstube <input type="checkbox"/> Small Fab <input type="checkbox"/> Finishing <input type="checkbox"/> Composite <input type="checkbox"/>	Water Jet <input type="checkbox"/> Prod. Eng. Coor. <input type="checkbox"/> Rec/Store/Packaging <input type="checkbox"/> Supplier <input type="checkbox"/>	Engineering <input type="checkbox"/> Quality <input type="checkbox"/> Other <input type="checkbox"/>				
Part No. _____											
NCR No. _____											
Root Cause		Date	Step	Qty	Description of work order update or Non-conformance	Initial Chief Eng	Action Description	Sign & Date	Verification	QC Inspector	
Doc/Data	<input type="checkbox"/>										
Equip/Tooling	<input type="checkbox"/>										
Operator	<input type="checkbox"/>										
Material	<input type="checkbox"/>										
Setup	<input type="checkbox"/>										
Other	<input type="checkbox"/>										
Process	<input type="checkbox"/>										
Supplier	<input type="checkbox"/>										
Training	<input type="checkbox"/>										
Unapproved	<input type="checkbox"/>										
FAULT CATEGORY											
Landing Gear			General								
Bending Centre Not Concentric to O/S Cracks Crushed/Crimped. Cuffs Heat Treat Inspection Strip in Tube Ripples in Bend Torque Waves in Extrusion Turning Sequence Wave/Twist in Tube			Bend BOM/Route Broken/Damaged Burrs Contamination Countersink Cut Too Short Drill Holes Drawing Finish Folio			Grain Hardware Inspection Incomplete Instructions Incomplete/Unclear Maintenance Mislabeled Misread Offset Out of Calibration Out of Sequence Outside Dimensions			Ovalized Over/Under tolerance Part Incorrect Part Lost/Missing Part Moved Positioned Wrong Power Loss/Surge		
									Pressure/Forced Temperature/Cure Weld Wrong Stock Pulled		
									<input type="checkbox"/> Other		

Work Order ID 87328

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87328

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Item ID: D212-664-101F

Accept

N900040100

Setup

Start

NS1

Revision ID:

Item Name: Crosstube Fwd

Stop

NS2

Start Date: 7/20/12 Start Qty: 1.00 *1*

Cust Item ID:

Required Date: 7/27/12 Req'd Qty: 1.00 *1*

Customer:

Reference:

Approvals: Process Plan: _____

Date: _____

Tooling: _____

Date: _____

Run

Start

NR1

QC: _____

Date: _____

SPC (Y/N): _____

Date: _____

Stop

NR2

Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours:

Tool ID

Tool #

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

190

QC5- Inspect part completeness to step on W/O

0.00

190

QC

Quality Control

Memo

0.00

Inspect for damage & ensure results are as per Dwg D212-664-141

191 Purchasing

Issue P-O for Anodizing PO 17527

12-7-24 (12/7/24)

193

Crosstubes Chemical Conversion

0.00

193

HandFXtube

Hand Finishing Crosstubes

Memo

0.00

AS 12-7-20

Pto →

195

QC7-Inspect Chemical Conversion Coat

0.00

195

QC

Quality Control

Memo

0.00

X J M.F
12-7-24

NCR: Yes No

WORK ORDER NON-CONFORMANCE / UPDATE

DQA: 12/8/02 Date: 12/8/02
Closed: 12/8/02 Date: 12/8/02

<p>87328 Work Order: <u>2212-664-101</u></p> <p>Part No. <u>2212-664-121F</u></p> <p>NCR No. <u>AC2-R-1615</u></p>				DISPOSITION		AGAINST DEPARTMENT/PROCESS						
<p>Rework <input type="checkbox"/></p> <p>Scrap <input type="checkbox"/></p> <p>Use-as-is <input type="checkbox"/></p> <p>Work Order Update <input type="checkbox"/></p>				<p>Skid-tube <input type="checkbox"/></p> <p>Machining <input type="checkbox"/></p> <p>Thermoforming <input type="checkbox"/></p> <p>Large Fab <input type="checkbox"/></p>		<p>Crosstube <input type="checkbox"/></p> <p>Small Fab <input type="checkbox"/></p> <p>Finishing <input type="checkbox"/></p> <p>Composite <input type="checkbox"/></p>		<p>Water Jet <input type="checkbox"/></p> <p>Prod. Eng. Coor. <input checked="" type="checkbox"/></p> <p>Rec/Store/Packaging <input type="checkbox"/></p> <p>Supplier <input type="checkbox"/></p>		<p>Engineering <input type="checkbox"/></p> <p>Quality <input type="checkbox"/></p> <p>Other <input type="checkbox"/></p>		
Root Cause		Date	Step	Qty	Description of work order update or Non-conformance		Initial Chief Eng	Action Description		Sign & Date	Verification	QC Inspector
Doc/Data	<input checked="" type="checkbox"/>	12/10/23	# A3	1	<p>Parts were Alkalized + Acid etch. as per w/o instructions. But should not have been due to x-tube being annealed. R.C. who was not available correctly.</p>		<p>DAS 16 05/20/23 12/10/23</p>	<p>Consult update w/o to have correct information on it.</p> <p>RTV to vendor for review. J.V. delayed on 8/3/23 P/N 12/10/23</p>				<p>DAS 16 05/20/23 12/10/23</p>
Equip/Tooling												
Operator												
Material												
Setup												
Other												
Process												
Supplier												
Training												
Unapproved												
FAULT CATEGORY												
<p>Landing Gear</p> <ul style="list-style-type: none"> <input type="checkbox"/> Bending <input type="checkbox"/> Centre Not Concentric to O/S <input type="checkbox"/> Cracks <input type="checkbox"/> Crushed/Crimped. <input type="checkbox"/> Cuffs <input type="checkbox"/> Heat Treat <input type="checkbox"/> Inspection Strip in Tube <input type="checkbox"/> Ripples in Bend <input type="checkbox"/> Torque Waves in Extrusion <input type="checkbox"/> Turning Sequence <input type="checkbox"/> Wave/Twist in Tube 					<p>General</p> <ul style="list-style-type: none"> <input type="checkbox"/> Bend <input type="checkbox"/> BOM/Route <input type="checkbox"/> Broken/Damaged <input type="checkbox"/> Burrs <input type="checkbox"/> Contamination <input type="checkbox"/> Countersink <input type="checkbox"/> Cut Too Short <input type="checkbox"/> Drill Holes <input type="checkbox"/> Drawing <input type="checkbox"/> Finish <input type="checkbox"/> Folio <input type="checkbox"/> Grain <input type="checkbox"/> Hardware <input checked="" type="checkbox"/> Inspection Incomplete <input checked="" type="checkbox"/> Instructions Incomplete/Unclear <input type="checkbox"/> Maintenance <input type="checkbox"/> Mislabeled <input checked="" type="checkbox"/> Misread <input type="checkbox"/> Offset <input type="checkbox"/> Out of Calibration <input type="checkbox"/> Out of Sequence <input type="checkbox"/> Outside Dimensions 							

Work Order ID 87328

July-13-12 12:38:24 PM

87328

Page 5

Item ID: D212-664-101F

Accept

N900040100

Setup

Start

NS1

Revision ID:

Item Name: Crosstube Fwd

Stop

NS2

Start Date: 7/20/12 Start Qty: 1.00 *1*

Cust Item ID:

Required Date: 7/27/12 Req'd Qty: 1.00 *1*

Customer:

Reference:

Approvals: Process Plan: _____

Date: _____

Tooling: _____

Date: _____

Run

Start

NR1

QC: _____

Date: _____

SPC (Y/N): _____

Date: _____

Stop

NR2

Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Tool ID

Tool #

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

200

Spray Painting per QSI005 4.2

0.00

200

SprayPaint

AS 12-7-25

SprayPaint

Memo

0.00

1-Prime inside and outside crosstube as per QSI 005 4.2

2-Paint outside crosstube as per DEO D212-667-141 with White Imron as per
QSI 005 4.2

PRIME: 121334
Start Time: 6:30
Finish Time: 7:15

PAINT: 122381
Start Time: 4:00
Finish Time: 4:45

210

QC14- Inspect Spray Paint

0.00

210

QC

Quality Control

Memo

0.00

Then, Wrap in plastic bag to protect from scratches

1 12:07 26

NCR: Yes / No

WORK ORDER NON-CONFORMANCE / UPDATE

DQA: _____ Date: _____

QA Closed: _____ Date: _____

Work Order: _____		DISPOSITION		AGAINST DEPARTMENT/PROCESS					
Part No. _____		Rework <input checked="" type="checkbox"/>	Skid-tube <input type="checkbox"/>	Crosstube <input checked="" type="checkbox"/>	Water Jet <input type="checkbox"/>	Engineering <input type="checkbox"/>			
NCR No. _____		Scrap <input checked="" type="checkbox"/>	Machining <input type="checkbox"/>	Small Fab <input type="checkbox"/>	Prod. Eng. Coor. <input type="checkbox"/>	Quality <input type="checkbox"/>			
		Use-as-is <input type="checkbox"/>	Thermoforming <input type="checkbox"/>	Finishing <input type="checkbox"/>	Rec/Store/Packaging <input type="checkbox"/>	Other <input type="checkbox"/>			
		Work Order Update <input type="checkbox"/>	Large Fab <input type="checkbox"/>	Composite <input type="checkbox"/>	Supplier <input type="checkbox"/>				
Root Cause	Date	Step	Qty	Description of work order update or Non-conformance	Initial Chief Eng	Action Description	Sign & Date	Verification	QC Inspector
Doc/Data				Paint mixture was wrong. R-C Humidity at that day.	 12/07/89	Strip all paint and Primer	AP 12-7-25	 12/07/89	 12/07/89
Equip/Tooling									
Operator									
Material									
Setup									
Other									
Process									
Supplier									
Training									
Unapproved									
FAULT CATEGORY									
Landing Gear				General					
<input type="checkbox"/> Bending	<input type="checkbox"/> Bend	<input type="checkbox"/> Ovalized	<input checked="" type="checkbox"/> Pressure/Forced						
<input type="checkbox"/> Centre Not Concentric to O/S	<input type="checkbox"/> BOM/Route	<input type="checkbox"/> Over/Under tolerance	<input checked="" type="checkbox"/> Temperature/Cure						
<input type="checkbox"/> Cracks	<input type="checkbox"/> Broken/Damaged	<input type="checkbox"/> Part Incorrect	<input type="checkbox"/> Weld						
<input type="checkbox"/> Crushed/Crimped.	<input type="checkbox"/> Burrs	<input type="checkbox"/> Part Lost/Missing	<input type="checkbox"/> Wrong Stock Pulled						
<input type="checkbox"/> Cuffs	<input type="checkbox"/> Contamination	<input type="checkbox"/> Part Moved							
<input type="checkbox"/> Heat Treat	<input type="checkbox"/> Countersink	<input type="checkbox"/> Positioned Wrong							
<input type="checkbox"/> Inspection Strip in Tube	<input type="checkbox"/> Cut Too Short	<input type="checkbox"/> Power Loss/Surge							
<input type="checkbox"/> Ripples in Bend	<input type="checkbox"/> Drill Holes								
<input type="checkbox"/> Torque Waves in Extrusion	<input type="checkbox"/> Drawing								
<input type="checkbox"/> Turning Sequence	<input type="checkbox"/> Finish								
<input type="checkbox"/> Wave/Twist in Tube	<input type="checkbox"/> Folio								
<hr/> <hr/> <hr/>									

Work Order ID 87328

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July-13-12 12:38:24 PM

Item ID: D212-664-101F

Accept

N900040100

Setup

Start

NS1

Revision ID:

Item Name: Crosstube Fwd

Stop

NS2

Start Date: 7/20/12 Start Qty: 1.00

1

Cust Item ID:

Required Date: 7/27/12 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals: Process Plan: _____

Date: _____

Tooling: _____

Date: _____

Run

Start

NR1

QC: _____

Date: _____

SPC (Y/N): _____

Date: _____

Stop

NR2

Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Tool ID

Tool #

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

220

220

Crosstubes

Crosstubes

0.00

AS

12 - 7 - 29

Crosstubes

Memo

0.00

1-Abrade mating surfaces of support and crosstube with 400 grit sandpaper,
clean the area with 4105S wash 'n' wipe

2-Install supports with Proseal 890 per DSI9563 and QSI 015
A/R Proseal 890 Batch: 122441

3- Torque bolts as per dwg

230

QC6- Inspect dimensions to drawing

0.00

DAS
16
88

12/17/13

230

QC

Quality Control

240

Pick Kit

0.00

12/17/13

240

Packaging

Memo

0.00

NCR: Yes / No

DQA: _____ Date: _____

WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order: _____			DISPOSITION		AGAINST DEPARTMENT/PROCESS						
			Rework <input type="checkbox"/>	Skid-tube <input type="checkbox"/>	Crosstube <input type="checkbox"/>	Water Jet <input type="checkbox"/>	Engineering <input type="checkbox"/>				
			Scrap <input type="checkbox"/>	Machining <input type="checkbox"/>	Small Fab <input type="checkbox"/>	Prod. Eng. Coor. <input type="checkbox"/>	Quality <input type="checkbox"/>				
			Use-as-is <input type="checkbox"/>	Thermoforming <input type="checkbox"/>	Finishing <input type="checkbox"/>	Rec/Store/Packaging <input type="checkbox"/>	Other <input type="checkbox"/>				
			Work Order Update <input type="checkbox"/>	Large Fab <input type="checkbox"/>	Composite <input type="checkbox"/>	Supplier <input type="checkbox"/>					
Root Cause	Date	Step	Qty	Description of work order update or Non-conformance		Initial Chief Eng	Action Description		Sign & Date	Verification	QC Inspector
Doc/Data											
Equip/Tooling											
Operator											
Material											
Setup											
Other											
Process											
Supplier											
Training											
Unapproved											
FAULT CATEGORY											
Landing Gear				General							
				Bending <input type="checkbox"/>	Bend <input type="checkbox"/>	Grain <input type="checkbox"/>	Ovalized <input type="checkbox"/>	Pressure/Forced <input type="checkbox"/>			
				Centre Not Concentric to O/S <input type="checkbox"/>	BOM/Route <input type="checkbox"/>	Hardware <input type="checkbox"/>	Over/Under tolerance <input type="checkbox"/>	Temperature/Cure <input type="checkbox"/>			
				Cracks <input type="checkbox"/>	Broken/Damaged <input type="checkbox"/>	Inspection Incomplete <input type="checkbox"/>	Part Incorrect <input type="checkbox"/>	Weld <input type="checkbox"/>			
				Crushed/Crimped. <input type="checkbox"/>	Burrs <input type="checkbox"/>	Instructions Incomplete/Unclear <input type="checkbox"/>	Part Lost/Missing <input type="checkbox"/>	Wrong Stock Pulled <input type="checkbox"/>			
				Cuffs <input type="checkbox"/>	Contamination <input type="checkbox"/>	Maintenance <input type="checkbox"/>	Part Moved <input type="checkbox"/>				
				Heat Treat <input type="checkbox"/>	Countersink <input type="checkbox"/>	Mislabeled <input type="checkbox"/>	Positioned Wrong <input type="checkbox"/>				
				Inspection Strip in Tube <input type="checkbox"/>	Cut Too Short <input type="checkbox"/>	Misread <input type="checkbox"/>	Power Loss/Surge <input type="checkbox"/>	Other <input type="checkbox"/>			
				Ripples in Bend <input type="checkbox"/>	Drill Holes <input type="checkbox"/>	Offset <input type="checkbox"/>					
				Torque Waves in Extrusion <input type="checkbox"/>	Drawing <input type="checkbox"/>	Out of Calibration <input type="checkbox"/>					
				Turning Sequence <input type="checkbox"/>	Finish <input type="checkbox"/>	Out of Sequence <input type="checkbox"/>					
				Wave/Twist in Tube <input type="checkbox"/>	Folio <input type="checkbox"/>	Outside Dimensions <input type="checkbox"/>					

Work Order ID 87328

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July-13-12 12:38:24 PM

Item ID: D212-664-101F

Accept

N900040100

Setup

Start

NS1

Revision ID:

Item Name: Crosstube Fwd

Stop

NS2

Start Date: 7/20/12 Start Qty: 1.00

1

Cust Item ID:

Required Date: 7/27/12 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals: Process Plan:

Date:

Tooling:

Date:

Run

Start

NR1

QC:

Date:

SPC (Y/N):

Date:

Stop

NR2

Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Tool ID

Tool #

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

250

QC4- 100% Inspect kits for completeness

0.00

DAS
16
9-89

7/24/13

250

QC

Quality Control

260

Packaging

0.00

260

Packaging

Packaging

Memo

0.00

Identify and pack for shipping as per PPP D212-664-101

SHIP



270

QC21- Final Inspection - Work Order Release

0.00

270

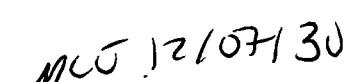
QC

Quality Control

Memo

0.00





NCR: Yes / No

WORK ORDER NON-CONFORMANCE / UPDATE

DQA: _____ Date: _____

QA Closed: _____ Date: _____

Work Order: _____			DISPOSITION		AGAINST DEPARTMENT/PROCESS					
			Rework <input type="checkbox"/>	Skid-tube <input type="checkbox"/>	Crosstube <input type="checkbox"/>	Water Jet <input type="checkbox"/>	Engineering <input type="checkbox"/>			
			Scrap <input type="checkbox"/>	Machining <input type="checkbox"/>	Small Fab <input type="checkbox"/>	Prod. Eng. Coor. <input type="checkbox"/>	Quality <input type="checkbox"/>			
			Use-as-is <input type="checkbox"/>	Thermoforming <input type="checkbox"/>	Finishing <input type="checkbox"/>	Rec/Store/Packaging <input type="checkbox"/>	Other <input type="checkbox"/>			
			Work Order Update <input type="checkbox"/>	Large Fab <input type="checkbox"/>	Composite <input type="checkbox"/>	Supplier <input type="checkbox"/>				
Root Cause	Date	Step	Qty	Description of work order update or Non-conformance	Initial Chief Eng	Action Description	Sign & Date	Verification	QC Inspector	
Doc/Data										
Equip/Tooling										
Operator										
Material										
Setup										
Other										
Process										
Supplier										
Training										
Unapproved										
FAULT CATEGORY										
Landing Gear <input type="checkbox"/> Bending <input type="checkbox"/> Centre Not Concentric to O/S <input type="checkbox"/> Cracks <input type="checkbox"/> Crushed/Crimped. <input type="checkbox"/> Cuffs <input type="checkbox"/> Heat Treat <input type="checkbox"/> Inspection Strip in Tube <input type="checkbox"/> Ripples in Bend <input type="checkbox"/> Torque Waves in Extrusion <input type="checkbox"/> Turning Sequence <input type="checkbox"/> Wave/Twist in Tube				General <input type="checkbox"/> Bend <input type="checkbox"/> BOM/Route <input type="checkbox"/> Broken/Damaged <input type="checkbox"/> Burrs <input type="checkbox"/> Contamination <input type="checkbox"/> Countersink <input type="checkbox"/> Cut Too Short <input type="checkbox"/> Drill Holes <input type="checkbox"/> Drawing <input type="checkbox"/> Finish <input type="checkbox"/> Folio <input type="checkbox"/> Grain <input type="checkbox"/> Hardware <input type="checkbox"/> Inspection Incomplete <input type="checkbox"/> Instructions Incomplete/Unclear <input type="checkbox"/> Maintenance <input type="checkbox"/> Mislabeled <input type="checkbox"/> Misread <input type="checkbox"/> Offset <input type="checkbox"/> Out of Calibration <input type="checkbox"/> Out of Sequence <input type="checkbox"/> Outside Dimensions						
				<input type="checkbox"/> Ovalized <input type="checkbox"/> Over/Under tolerance <input type="checkbox"/> Part Incorrect <input type="checkbox"/> Part Lost/Missing <input type="checkbox"/> Part Moved <input type="checkbox"/> Positioned Wrong <input type="checkbox"/> Power Loss/Surge <input type="checkbox"/> Other						

NCR: Yes / No

DQA: _____ Date: _____

WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order: _____			DISPOSITION		AGAINST DEPARTMENT/PROCESS						
			Rework <input type="checkbox"/>	Skid-tube <input type="checkbox"/>	Crosstube <input type="checkbox"/>	Water Jet <input type="checkbox"/>	Engineering <input type="checkbox"/>				
			Scrap <input type="checkbox"/>	Machining <input type="checkbox"/>	Small Fab <input type="checkbox"/>	Prod. Eng. Coor. <input type="checkbox"/>	Quality <input type="checkbox"/>				
			Use-as-is <input type="checkbox"/>	Thermoforming <input type="checkbox"/>	Finishing <input type="checkbox"/>	Rec/Store/Packaging <input type="checkbox"/>	Other <input type="checkbox"/>				
			Work Order Update <input type="checkbox"/>	Large Fab <input type="checkbox"/>	Composite <input type="checkbox"/>	Supplier <input type="checkbox"/>					
Root Cause	Date	Step	Qty	Description of work order update or Non-conformance		Initial Chief Eng	Action Description		Sign & Date	Verification	QC Inspector
Doc/Data											
Equip/Tooling											
Operator											
Material											
Setup											
Other											
Process											
Supplier											
Training											
Unapproved											
FAULT CATEGORY											
Landing Gear				General							
				Bending <input type="checkbox"/>	Bend <input type="checkbox"/>	Grain <input type="checkbox"/>	Ovalized <input type="checkbox"/>	Pressure/Forced <input type="checkbox"/>			
Centre Not Concentric to O/S <input type="checkbox"/>	BOM/Route <input type="checkbox"/>	Hardware <input type="checkbox"/>	Over/Under tolerance <input type="checkbox"/>	Temperature/Cure <input type="checkbox"/>							
Cracks <input type="checkbox"/>	Broken/Damaged <input type="checkbox"/>	Inspection Incomplete <input type="checkbox"/>	Part Incorrect <input type="checkbox"/>	Weld <input type="checkbox"/>							
Crushed/Crimped. <input type="checkbox"/>	Burrs <input type="checkbox"/>	Instructions Incomplete/Unclear <input type="checkbox"/>	Part Lost/Missing <input type="checkbox"/>	Wrong Stock Pulled <input type="checkbox"/>							
Cuffs <input type="checkbox"/>	Contamination <input type="checkbox"/>	Maintenance <input type="checkbox"/>	Part Moved <input type="checkbox"/>								
Heat Treat <input type="checkbox"/>	Countersink <input type="checkbox"/>	Mislabeled <input type="checkbox"/>	Positioned Wrong <input type="checkbox"/>								
Inspection Strip in Tube <input type="checkbox"/>	Cut Too Short <input type="checkbox"/>	Misread <input type="checkbox"/>	Power Loss/Surge <input type="checkbox"/>								
Ripples in Bend <input type="checkbox"/>	Drill Holes <input type="checkbox"/>	Offset <input type="checkbox"/>	Other <input type="checkbox"/>								
Torque Waves in Extrusion <input type="checkbox"/>	Drawing <input type="checkbox"/>	Out of Calibration <input type="checkbox"/>									
Turning Sequence <input type="checkbox"/>	Finish <input type="checkbox"/>	Out of Sequence <input type="checkbox"/>									
Wave/Twist in Tube <input type="checkbox"/>	Folio <input type="checkbox"/>	Outside Dimensions <input type="checkbox"/>									

Picklist Print

July-13-12 12:38:23 PM

Page 2

Work Order ID: 87328

Parent Item: D212-664-101F

Parent Item Name: Crosstube Fwd

Start Date: 7/20/12

Required Date: 7/27/12

Start Qty: 1.00

Required Qty: 1.00

MS21920-25

Clamp(per MIL-DTL-8783C)

Purchased

No

220

Each

136.0000

4

4

Ad 12-7-29

<u>Location</u>	<u>Loc Qty</u>	<u>Loc Code</u>
-----------------	----------------	-----------------

LG050	117	
-------	-----	--

116264	2	
--------	---	--

117998	4	
--------	---	--

118142	4	
--------	---	--

119339	2	
--------	---	--

119746	2	
--------	---	--

120475	7	
--------	---	--

120920	46	
--------	----	--

122204	50	
--------	----	--

LG051	19	
-------	----	--

121583	19	
--------	----	--

(4)

D2893-1

2.75 Support

Manufactured

No

220

Each

16.0000

2

2

Ad 12-7-29

<u>Location</u>	<u>Loc Qty</u>	<u>Loc Code</u>
-----------------	----------------	-----------------

LG	9	
----	---	--

83056	9	
-------	---	--

LG052	7	
-------	---	--

72865	2	
-------	---	--

80271	4	
-------	---	--

82228	1	
-------	---	--

(2)

5
D3428-1
Placard

Manufactured

No

240

Each

33.0000

1

12/13/30 JL

<u>Location</u>	<u>Loc Qty</u>	<u>Loc Code</u>
-----------------	----------------	-----------------

ST042	33	
-------	----	--

78933	2	
-------	---	--

81881	9	
-------	---	--

83582	10	
-------	----	--

85228	12	
-------	----	--

NCR: Yes / No

DQA: _____ Date: _____

WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order: _____			DISPOSITION		AGAINST DEPARTMENT/PROCESS					
			Rework <input type="checkbox"/>	Skid-tube <input type="checkbox"/>	Crosstube <input type="checkbox"/>	Water Jet <input type="checkbox"/>	Engineering <input type="checkbox"/>			
			Scrap <input type="checkbox"/>	Machining <input type="checkbox"/>	Small Fab <input type="checkbox"/>	Prod. Eng. Coor. <input type="checkbox"/>	Quality <input type="checkbox"/>			
			Use-as-is <input type="checkbox"/>	Thermoforming <input type="checkbox"/>	Finishing <input type="checkbox"/>	Rec/Store/Packaging <input type="checkbox"/>	Other <input type="checkbox"/>			
			Work Order Update <input type="checkbox"/>	Large Fab <input type="checkbox"/>	Composite <input type="checkbox"/>	Supplier <input type="checkbox"/>				
Root Cause	Date	Step	Qty	Description of work order update or Non-conformance	Initial Chief Eng	Action Description	Sign & Date	Verification	QC Inspector	
Doc/Data										
Equip/Tooling										
Operator										
Material										
Setup										
Other										
Process										
Supplier										
Training										
Unapproved										
FAULT CATEGORY										
Landing Gear <input type="checkbox"/> Bending <input type="checkbox"/> Centre Not Concentric to O/S <input type="checkbox"/> Cracks <input type="checkbox"/> Crushed/Crimped <input type="checkbox"/> Cuffs <input type="checkbox"/> Heat Treat <input type="checkbox"/> Inspection Strip in Tube <input type="checkbox"/> Ripples in Bend <input type="checkbox"/> Torque Waves in Extrusion <input type="checkbox"/> Turning Sequence <input type="checkbox"/> Wave/Twist in Tube				General <input type="checkbox"/> Bend <input type="checkbox"/> BOM/Route <input type="checkbox"/> Broken/Damaged <input type="checkbox"/> Burrs <input type="checkbox"/> Contamination <input type="checkbox"/> Countersink <input type="checkbox"/> Cut Too Short <input type="checkbox"/> Drill Holes <input type="checkbox"/> Drawing <input type="checkbox"/> Finish <input type="checkbox"/> Folio <input type="checkbox"/> Grain <input type="checkbox"/> Hardware <input type="checkbox"/> Inspection Incomplete <input type="checkbox"/> Instructions Incomplete/Unclear <input type="checkbox"/> Maintenance <input type="checkbox"/> Mislabeled <input type="checkbox"/> Misread <input type="checkbox"/> Offset <input type="checkbox"/> Out of Calibration <input type="checkbox"/> Out of Sequence <input type="checkbox"/> Outside Dimensions						
				<input type="checkbox"/> Ovalized <input type="checkbox"/> Over/Under tolerance <input type="checkbox"/> Part Incorrect <input type="checkbox"/> Part Lost/Missing <input type="checkbox"/> Part Moved <input type="checkbox"/> Positioned Wrong <input type="checkbox"/> Power Loss/Surge <input type="checkbox"/> Other						
				<input type="checkbox"/> Pressure/Forced <input type="checkbox"/> Temperature/Cure <input type="checkbox"/> Weld <input type="checkbox"/> Wrong Stock Pulled						

Picklist Print

July-13-12 12:38:23 PM

Page 3

Work Order ID: 87328

Parent Item: D212-664-101F

Parent Item Name: Crosstube Fwd

Start Date: 7/20/12

Start Qty: 1.00

Required Date: 7/27/12

Required Qty: 1.00

AN6-35A
BOLT

Purchased No 240 Each 42.0000

4

AN6-36A
Bolt

Purchased No 240 Each 47.0000

4

MS21042L6
Nut

Purchased No 240 Each 479.0000

6

AN960JD616
Washer

NAS1149D0663J Purchased No 240 Each 0.0000

18

12/17/08
(2/17/30 SJ)

NCR: Yes / No

DQA: _____ Date: _____

WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order: _____		DISPOSITION		AGAINST DEPARTMENT/PROCESS									
Part No. _____		Rework <input type="checkbox"/>	Skid-tube <input type="checkbox"/>	Crosstube <input type="checkbox"/>	Water Jet <input type="checkbox"/>	Engineering <input type="checkbox"/>							
NCR No. _____		Scrap <input type="checkbox"/>	Machining <input type="checkbox"/>	Small Fab <input type="checkbox"/>	Prod. Eng. Coor. <input type="checkbox"/>	Quality <input type="checkbox"/>							
		Use-as-is <input type="checkbox"/>	Thermoforming <input type="checkbox"/>	Finishing <input type="checkbox"/>	Rec/Store/Packaging <input type="checkbox"/>	Other <input type="checkbox"/>							
		Work Order Update <input type="checkbox"/>	Large Fab <input type="checkbox"/>	Composite <input type="checkbox"/>	Supplier <input type="checkbox"/>								
Root Cause	Date	Step	Qty	Description of work order update or Non-conformance	Initial Chief Eng	Action Description	Sign & Date	Verification	QC Inspector				
Doc/Data													
Equip/Tooling													
Operator													
Material													
Setup													
Other													
Process													
Supplier													
Training													
Unapproved													
FAULT CATEGORY													
Landing Gear <input type="checkbox"/> Bending <input type="checkbox"/> Centre Not Concentric to O/S <input type="checkbox"/> Cracks <input type="checkbox"/> Crushed/Crimped <input type="checkbox"/> Cuffs <input type="checkbox"/> Heat Treat <input type="checkbox"/> Inspection Strip in Tube <input type="checkbox"/> Ripples in Bend <input type="checkbox"/> Torque Waves in Extrusion <input type="checkbox"/> Turning Sequence <input type="checkbox"/> Wave/Twist in Tube				General <input type="checkbox"/> Bend <input type="checkbox"/> BOM/Route <input type="checkbox"/> Broken/Damaged <input type="checkbox"/> Burrs <input type="checkbox"/> Contamination <input type="checkbox"/> Countersink <input type="checkbox"/> Cut Too Short <input type="checkbox"/> Drill Holes <input type="checkbox"/> Drawing <input type="checkbox"/> Finish <input type="checkbox"/> Folio <input type="checkbox"/> Grain <input type="checkbox"/> Hardware <input type="checkbox"/> Inspection Incomplete <input type="checkbox"/> Instructions Incomplete/Unclear <input type="checkbox"/> Maintenance <input type="checkbox"/> Mislabeled <input type="checkbox"/> Misread <input type="checkbox"/> Offset <input type="checkbox"/> Out of Calibration <input type="checkbox"/> Out of Sequence <input type="checkbox"/> Outside Dimensions						<input type="checkbox"/> Ovalized <input type="checkbox"/> Over/Under tolerance <input type="checkbox"/> Part Incorrect <input type="checkbox"/> Part Lost/Missing <input type="checkbox"/> Part Moved <input type="checkbox"/> Positioned Wrong <input type="checkbox"/> Power Loss/Surge <input type="checkbox"/> Pressure/Forced <input type="checkbox"/> Temperature/Cure <input type="checkbox"/> Weld <input type="checkbox"/> Wrong Stock Pulled <input type="checkbox"/> Other			

DART AEROSPACE LTD

Work Order: 87328

Description: Crosstube High Fwd (205/212/412)

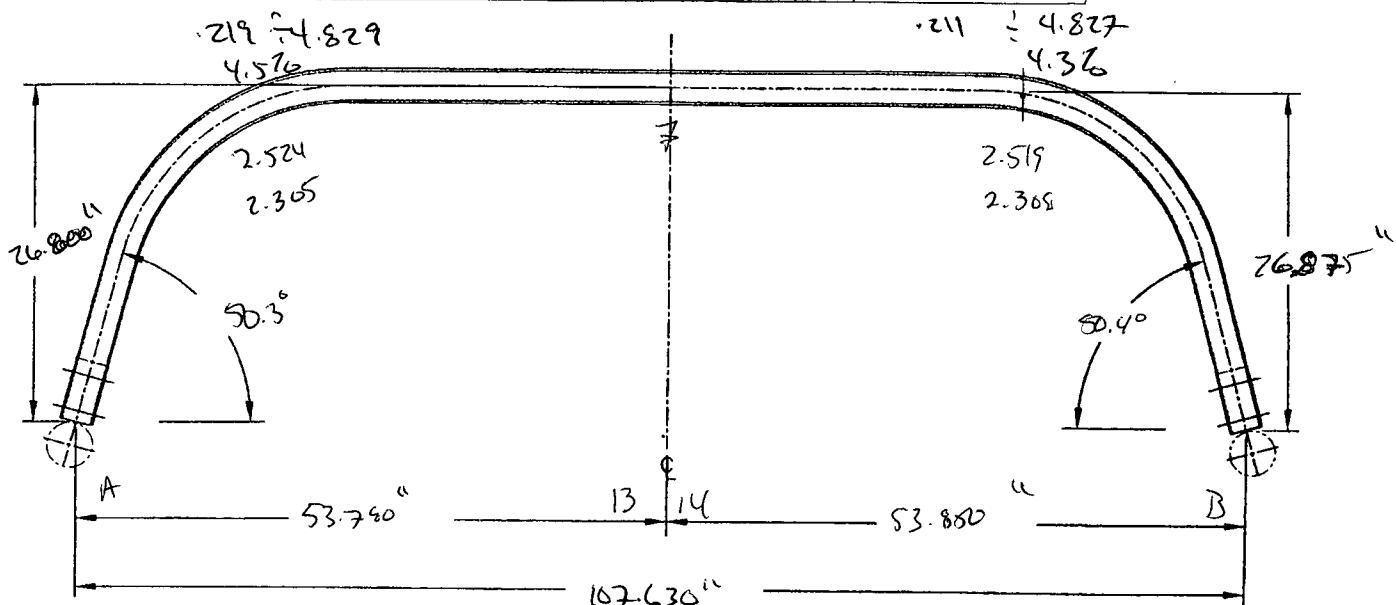
Part Number: D212-664-101

Inspection Dwg: D212-664-141

Rev: D

Page 1 of 1

Required Dimension	Min	Max
Height	26.79	27.05
1/2 Span	53.59	53.85
Angle	49	52
Total Span	107.18	107.7
Bending Passes	3	--
Crushing	--	6%



	Side A	Middle	Side B
Bending Passes	13	7	14
Crushing	4.570		4.370
Comments			
Side A has 13 passes.			
Side middle has 7 passes.			
Side B has 14 passes.			

QC15 Inspection	(DAS)	10/19
Date	16	8-89

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	
B	08.04.21	Dwg Rev updated	KJ/JM	
C	10.04.01	Dwg Rev updated	KJ	
D	12.04.16	Added bending, crushing dimensions	KJ	PP

D

Item	Qty	Qty	Part Number	Description
	-141	-141B		
1	X		D212-664-141	CROSSTUBE ASSEMBLY (205/212/412 HIGH FWD)
2	X		D212-664-141B	CROSSTUBE ASSEMBLY (214 HIGH FWD)
3	1	1	D6005-128	CROSSTUBE
4	2	2	D2893-1	SUPPORT
5	4	4	D3595-063-450	RUBBER CUSHION
6	4	4	MS21920-25	CLAMP (OR MS21920-26)
7	A/R	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)

GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D6005-128
FINISHED LENGTH = 126.514±0.020
- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED
- 5) BREAK SHARP EDGES. 0.005 TO 0.010 MAX
- 6) IDENTIFICATION: SCRIBE DART PART NUMBER "D212-664-XXX" AND BATCH NUMBER ON INSIDE OF CUFF
USING VIBRATING STYLUS
- 7) WEIGHT: D212-664-141 = 33.6 lbs (PER IIN-D212-664)
D212-664-141B = 33.6 lbs (PER IIN-D212-664)
- 8) PART IS SYMMETRIC ABOUT CENTERLINE.
- 9) RUN CUTTER OFF PART. BLEND OUT EDGE LONGITUDINALLY. TRANSITION SHOULD BE SMOOTH.
- 10) BEND PROGRESSIVELY WITH A MINIMUM OF 3 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
- 11) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 12) INSTALL D2893-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF D2893-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 13) INSTALL MS21920-25 CLAMPS (OR -26) WITH D3595-063-450 RUBBER CUSHIONS TO SECURE THE D2893-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE OF CROSSTUBE SUPPORT.
- 14) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- 15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

SHOP COPY

RETURN TO
ENGINEERING

UNCONTROLLED COPY

SUBJECT TO AMENDMENT

WITHOUT NOTICE

WORK ORDER

46 82320M0

12/07/16

REMOVED FROM UNDER REVIEW PER
UNDER REVIEW
46 11/06/13 11/07/26

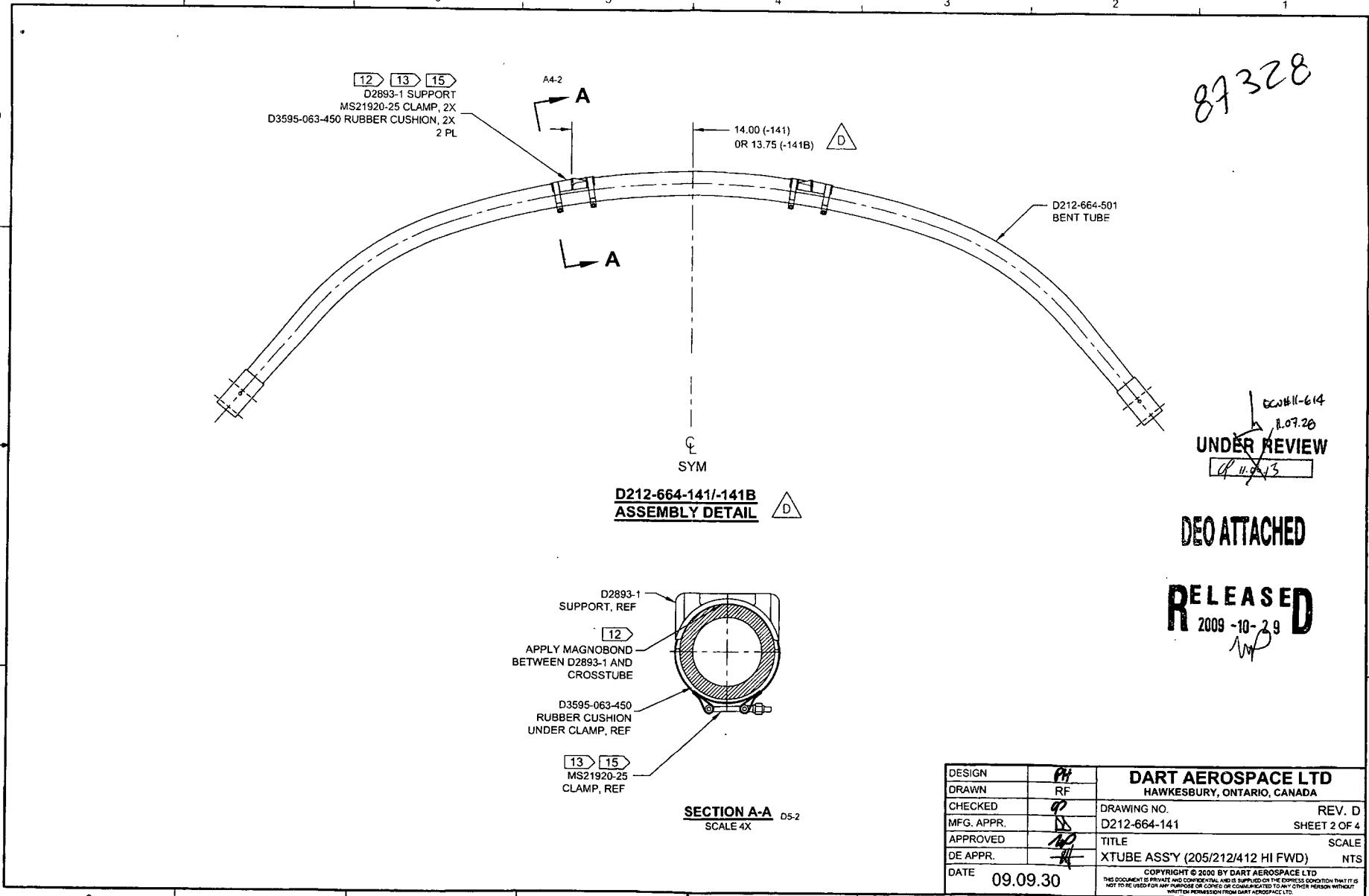
FOR PROGRESS REPORT

DEO ATTACHED

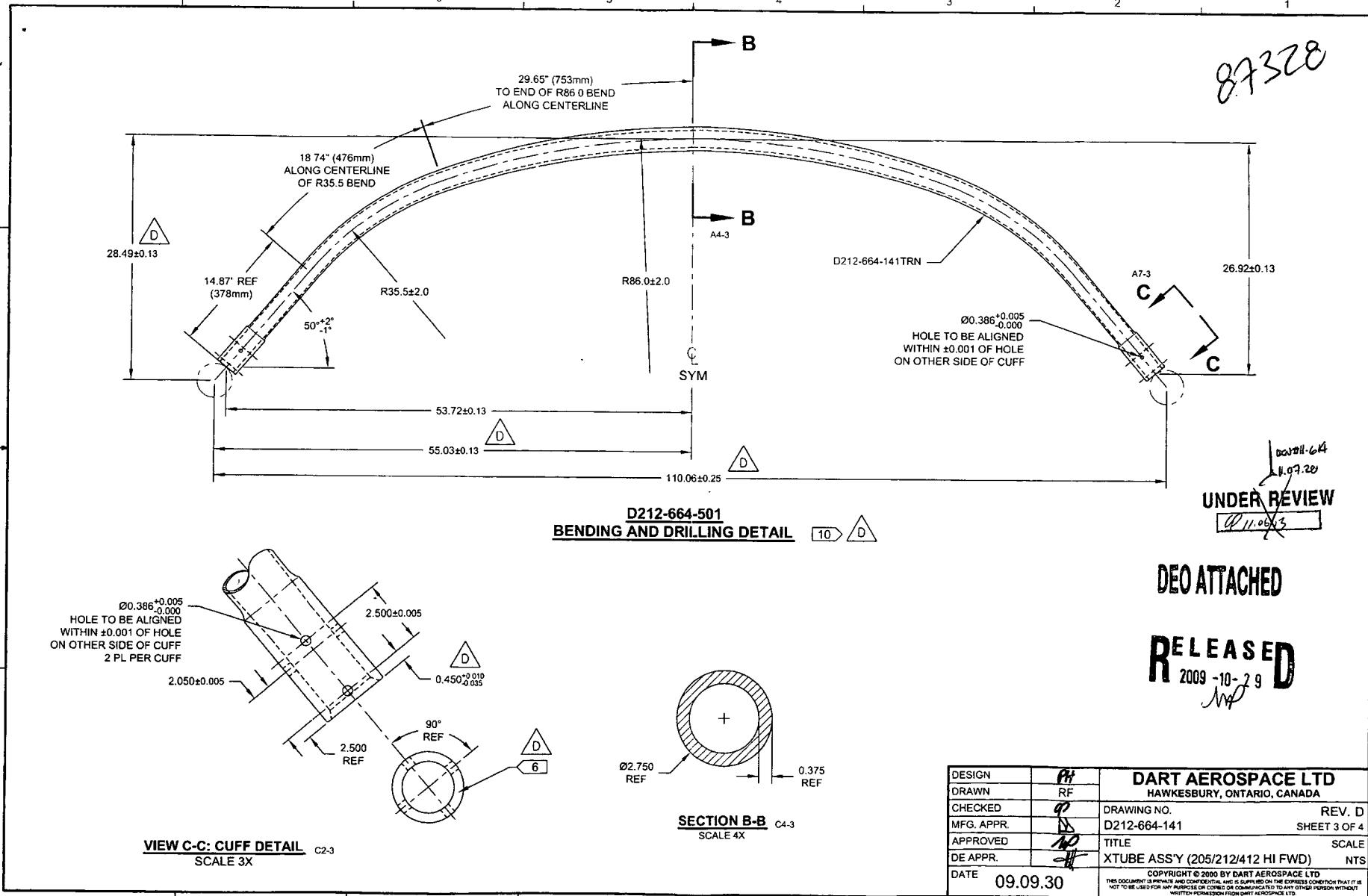
RELEASED
2009-10-29
MM

D	REFORMAT/REVISE GENERAL NOTES/PART LIST; REORGANIZED VIEWS AND REFORMATTED DRAWING TO CURRENT STANDARDS; ADD -141B (ZN B4-2, D4-2); REMOVED REF & ADD TOLERANCES (ZN B4-3, C6-3, CB-3; & B6-3); RELOCATED FLAG #6 PER PAR 08-046 (ZN A5-3); MOVED TURNING DETAIL & UPDATED TOLERANCE TO SHEET 4	RF	09.09.30
C	REMOVE -851 ABRASION STRIP. ADD MAGNOBOND 6398, CUSHION, REVERSE CLAMPS	PH	07.03.08
B	ADD HOLES FOR COMPATABILITY WITH BHT/AA SKIDTUBES	PH	05.02.04
A	NEW ISSUE	PH	00.12.12
REV.	DESCRIPTION	BY	DATE

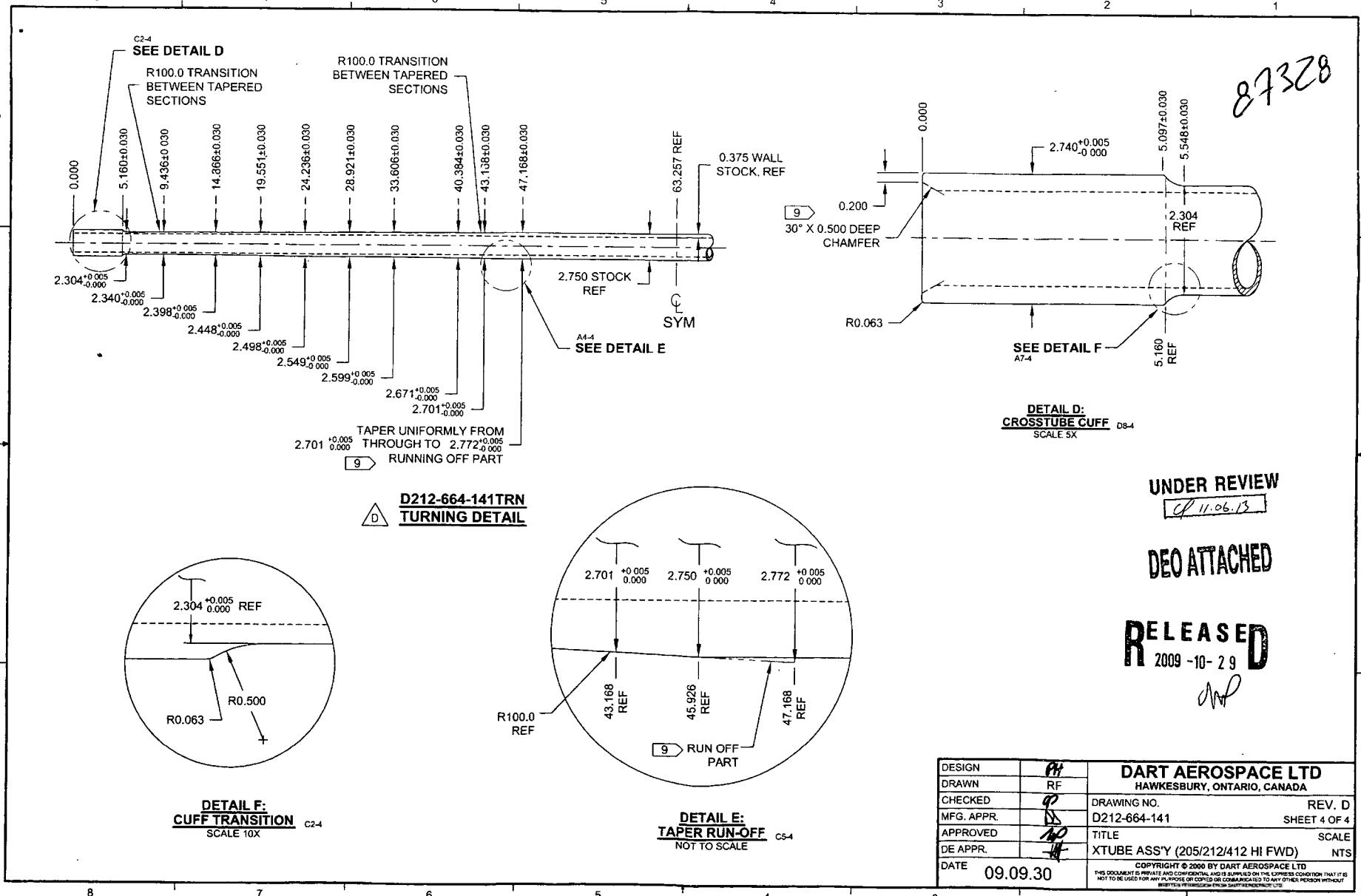
DESIGN	PH	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	PP	DRAWING NO.	REV. D
MFG. APPR.	DD	D212-664-141	SHEET 1 OF 4
APPROVED	MM	TITLE	SCALE
DE APPR.	MM	XTUBE ASSY (205/212/412 HI FWD)	NTS
DATE	09.09.30	COPYRIGHT © 2009 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY OTHER PURPOSE OR DISCLOSED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.	



DESIGN	<i>RF</i>	DART AEROSPACE LTD
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA
CHECKED	<i>RF</i>	DRAWING NO. REV. D
MFG. APPR.	<i>RF</i>	D212-664-141 SHEET 2 OF 4
APPROVED	<i>RF</i>	TITLE SCALE
DE APPR.	<i>RF</i>	XTUBE ASSY (205/212/412 HI FWD) NTS
DATE	09.09.30	COPYRIGHT © 2000 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OTHER THAN THAT FOR WHICH IT WAS PROVIDED OR FOR ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.



DESIGN	RF	DART AEROSPACE LTD
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA
CHECKED	PP	DRAWING NO.
MFG. APPR.	MM	D212-664-141
APPROVED	MM	REV. D
DE APPR.	MM	SHEET 3 OF 4
DATE	09.09.30	TITLE
		XTUBE ASSY (205/212/412 HI FWD) NTS
		COPYRIGHT © 2000 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.



87328

DRAWING NO. D212-664-141	TITLE XTUBE ASSY (205/212/412 HI FWD)	REV. D	DART AEROSPACE LTD ENGINEERING ORDER	D.E.O. NO. D212-664-141-D-1	SHEET NO. SHEET 1 OF 2	SCALE NTS
DRAWN	CHECKED <i>RP</i>	MFG. APPR. <i>RE</i>	APPROVED <i>MP</i>	DE APPR. <i>TH</i>		
DATE 11.04.07	DATE 11.04.11	DATE 11.04.12	DATE 11/09/12	DATE	11.04.12	

PURPOSE:

ADD AN INSPECTION WINDOW TO UNDERSIDE OF CROSSTUBE.

RELEASED
2011-04-18**CHANGE:**

NOTES 2 OF SHEET 1 IS AMENDED AS FOLLOWS:

IS:

2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
 PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
 MASK UNDERSIDE OF CROSSTUBE AS SHOWN (HATCHED AREA) AND
 PAINT OUTSIDE PER DART QSI 005 4.2
 REMOVE MASKING AND APPLY CLEAR COAT

UNDER REVIEW

RP 06.13
ECW 11-664
11.07.28

WAS:

2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
 PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
 PAINT OUTSIDE PER DART QSI 005 4.2

87328

DRAWING NO. D212-664-141	TITLE XTUBE ASSY (205/212/412 HI FWD)	REV. D	DART AEROSPACE LTD ENGINEERING ORDER	D.E.O. NO. D212-664-141-D-1	SHEET NO. SHEET 2 OF 2	SCALE NTS
DRAWN DATE 11.04.07	CHECKED DATE 11.04.11	MFG. APPR. GP	APPROVED DATE 11.04.12	WAD DATE 11/04/12	DE APPR. WAD DATE 11.04.12	

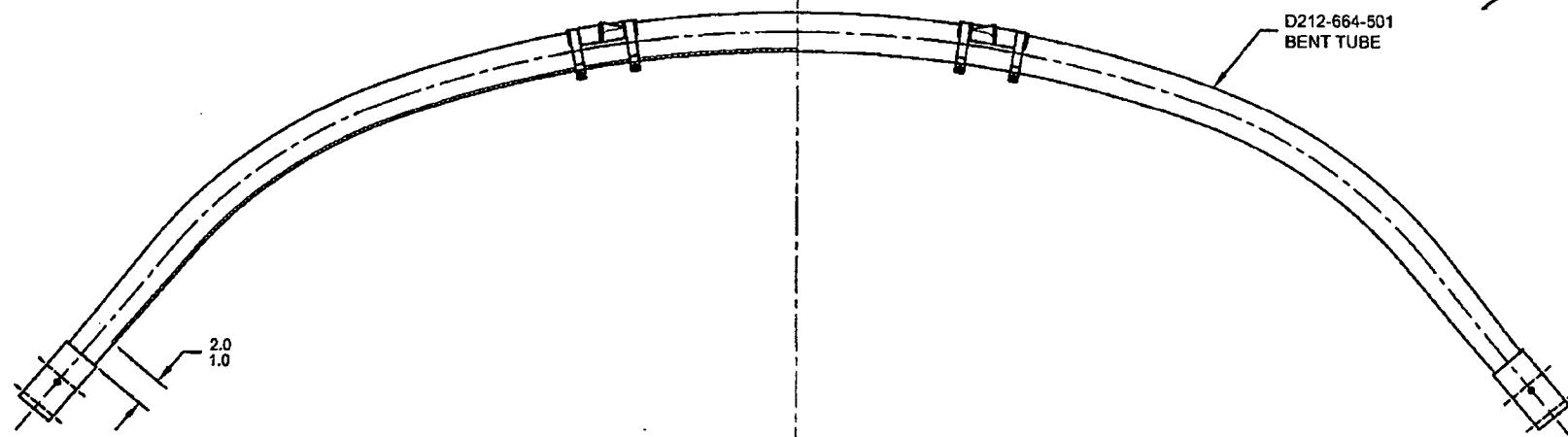
UNDER REVIEW

GP 11/06/13

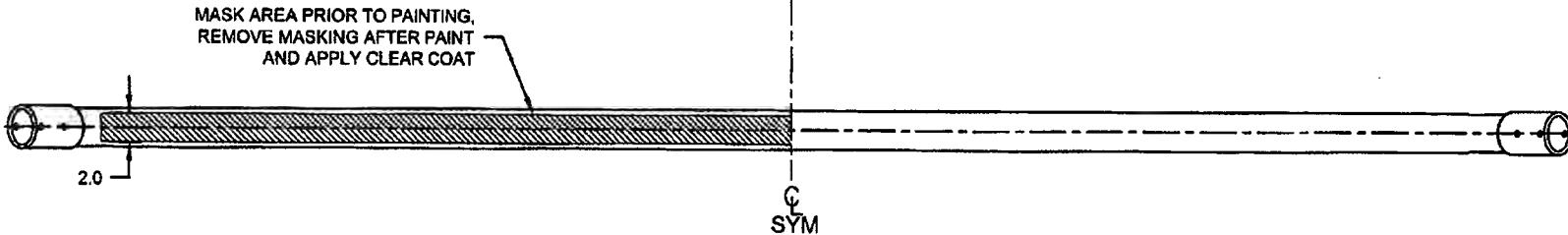
ECN# 11-664
11.07.28

IS:

WAS:



**D212-664-141/-141B
ASSEMBLY DETAIL**



87328

DRAWING NO. D212-664-141	TITLE CROSSTUBE ASS'Y (205 HI FWD)	REV. D	DART AEROSPACE LTD ENGINEERING ORDER	D.E.O. NO. D212-664-141-D-2	SHEET NO. SHEET 1 OF 1	SCALE NTS
DRAWN <i>DP</i>	CHECKED <i>ADS</i>	MFG. APPR. <i>AS</i>	APPROVED <i>MP</i>	DE APPR. <i>MP</i>		
DATE 11.07.15	DATE 11.07.20	DATE 11.07.21	DATE 11/07/21	DATE 11.07.21		

PURPOSE:
REPLACE MAGNOBOND WITH PROSEAL.

CHANGE:

IS:

Item	Qty -141	Qty -141B	Part Number	Description
7	A/R	A/R	PROSEAL 890 B-2	SEALANT, AMS-S-8802 CLASS B-2

WAS:

7	A/R	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)
---	-----	-----	----------------	---

NOTE 12 & 15, SHEET 1 IS AMENDED AS FOLLOWS:

IS:

- 12) TO INSTALL D2893-1, SUPPORT: ABRADE MATING SURFACE OF SUPPORT AND CROSSTUBE WITH 180-GRIT SANDPAPER AND REMOVE RESIDUE WITH MEK (OR EQUIVALENT). APPLY A 0.04" TO 0.07" THICK LAYER OF PROSEAL 890 CLASS B-2 (OR AMS-S-8802 CLASS B-2) SEALANT TO MATING SURFACE OF SUPPORT.
- 15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING. PRIOR TO PACKAGING, RE-CHECK TORQUE ON CLAMPS AFTER PROSEAL 890 SEALANT HAS CURED FOR 72 HOURS.

WAS:

- 12) INSTALL D2893-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF D2893-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.





LIQUID PENETRANT TEST REPORT

P- 12202

CLIENT DATE AND PLACE
ATTENTION ANDY / LINDA
ADDRESS 1270 ABERDEEN ST.
PROJECT F.P. I. ON CROSS TUBES
ITEM(S) EXAMINED — — PCS

DATE TUE 14 JUN 12 TIME 188-12-00 08:55
ACUREN JOB NO. 188-12-0085
PO/WO NO. —
WORK LOCATION SALE
ACCEPTANCE STD. ASTM E1417/05I REV./DATE 030 2005

JOB DESCRIPTION PROCEDURE NO. LT002 REV./DATE 2008 TECHNIQUE NO. LT-1002 REV./DATE 2008

PART NO. SEE REAR LTS MATERIAL Aluminum — THICKNESS VARIOUS
SCOPE A WET FLUORESCENT LIQUID PENETRANT EXAMINATION
WAS COMPLETED ON THE EXTERNAL SURFACE 100%

TEST DETAILS

METHOD	<input type="checkbox"/> FLUORESCENT	<input type="checkbox"/> VISIBLE	<input checked="" type="checkbox"/> WATER WASH	<input type="checkbox"/> SOLVENT REMOVABLE	<input type="checkbox"/> POST EMULSIFIED
FAMILY BRAND	<u>NAKNAFLUX</u>		BLACK LIGHT S/N <u>16459</u>	<input type="checkbox"/> OUTPUT > 1000 μ W/cm ²	<input type="checkbox"/> AMBIENT < 2 fc
PENETRANT	<u>2007</u>	MINIMUM Dwell TIME <u>45 10</u> MIN.	LIGHTING EQUIP. <input type="checkbox"/> FLASHLIGHT <input type="checkbox"/> TROUBLELIGHT <input type="checkbox"/> OUTPUT > 100 fc @ SURFACE		
PENETRANT REMOVER	<u>H2O</u>	MINIMUM DRY TIME <u>>10</u> MIN.	OTHER <u>LAB NO</u>		
DEVELOPER	<u>SKD 52</u>	MINIMUM Dwell TIME <u>10</u> MIN.	LIGHT METER S/N <u>1098866</u>	CAL DUE DATE <u>JUN 17, 2012</u>	
DEVELOPER TYPE	<input type="checkbox"/> NON AQUEOUS	<input type="checkbox"/> AQUEOUS	<input type="checkbox"/> DRY		

TEST SURFACE

SURFACE CONDITION AS GROUND AS WELDED MACHINED SHOT BLASTED CLEAN BARE METAL
SURFACE TEMPERATURE < -4°C/ 20°F -4°C/ 20°F TO 10°C/50°F 10°C/50°F TO 52°C/125°F > 52°C/125°F

RESULTS- METRIC IMPERIAL

CROSS TUBE O. C.	
1	85877
1	86693
1	86692
1	86764
1	86932
1	87320
1	85316
1	85317
1	85318

→ ENGINEER'S REQUEST - NCL
WAS ORIGINALLY NOT ON THE 12/2012
Chart P-10158.

Scope of Services
The agreement of Acuren Group Inc. to perform services extends only to those services provided for in writing. Under no circumstances shall such services extend beyond the performance of the requested services. It is expressly understood that all descriptions, comments and expressions of opinion reflect the opinions or observations of Acuren Group Inc. based on information and assumptions supplied by the owner/operator and are not intended nor can they be construed as representations or warranties. Acuren Group Inc. is not assuming any responsibilities of the owner/operator and the owner/operator retains complete responsibility for the engineering, manufacture, repair and use decisions as a result of the data or other information provided by Acuren Group Inc. In no event shall Acuren Group Inc.'s liability in respect of the services referred to herein exceed the amount paid for such services.

Standard of Care
In performing the services provided, Acuren Group Inc. uses the degree, care and skill ordinarily exercised under similar circumstances by others performing such services in the same or similar locality. No other warranty, expressed or implied, is made or intended by Acuren Group Inc.

SIGNATURES

CLIENT REPRESENTATIVE	<u>Andy Sheldon</u> PRINT	<u>Sheldon</u> SIGNATURE	DTR # <u>E117389</u>
TECHNICIAN (SIGNATURE):	<u>MKE Sheldon</u>		REPORT
NAME (PRINT):	1 ST TECHNICIAN CGSB LEVEL <u>#</u> SNT LEVEL <u>6006</u> CGSB REG. NO. <u>6006</u>	2 ND TECHNICIAN CGSB LEVEL _____ SNT LEVEL _____ CGSB REG. NO. _____	REVIEWED BY:
			NAME <u></u> INITIALS <u></u>

WHITE - CLIENT COPY

CANARY - OFFICE COPY

PINK - TECHNICIAN COPY

GOLD - OFFICE COPY



A.T.G. Industries Inc.
731, rue Industrielle Rd.
PLATING DEPARTMENT
Rockland, On K4K 1T2
Canada
Ph: (613) 446-4544
Fax: (613) 446-4556

Pack List

Number: 61836

Date: 24-Jul-12

To

DART AEROSPACE LTD
1270 ABERDEEN ST.
HAWKESBURY, ON K6A 1K7
CANADA

Ship To

DART AEROSPACE LTD
1270 ABERDEEN ST.
HAWKESBURY, ON K6A 1K7
CANADA

Ph: 613-632-5200

Fax: 613-632-1185

Ph: 613-632-5200

Fax: 613-632-1185

Terms	Ship Via	
Quantity	Description	Rev:
2 ea	Part: D212-664-101F STRIP YELLOW IRRIDITE CLEAR ANODIZE MIL-A-8625 TYPE 2 CLASS 1 Job: 20120440	PO: PO17527 Line:
Certificate of Conformance		
A.T.G. Industries certifies that all items in this shipment are in conformance with all requirements, specifications and drawings referenced in the purchase order.		
ISO 9001 : 2008 REGISTERED ATG SALES-2010 TERMS APPLY		
DATE: <u>24/7/12</u>		
CERTIFIED SIGNATURE: <u>MM</u>		
RECEIVER SIGNATURE: _____		

5.0 PARTS LIST

5.1 HIGH GEAR CROSSTUBES

Item	-101	-201	-203	Part Number	Description
	X			D212-664-101	CROSSTUBE INSTALLATION, 204/205/210/212/214/412, UH-1H, UH-1A/B/E/F/L/P, TH-1F/L, HH-1K HIGH FWD
		X		D212-664-201	CROSSTUBE INSTALLATION, 204/205/210/212/214, UH-1H, UH-1A/B/E/F/L/P, TH-1F/L, HH-1K HIGH AFT
			X	D412-664-203	CROSSTUBE INSTALLATION, 412 HIGH AFT
1	1			D212-664-141	CROSSTUBE ASSEMBLY, 204/205/210/212/214/412, UH-1H, UH-1A/B/E/F/L/P, TH-1F/L, HH-1K HIGH FWD
2		1		D212-664-241	CROSSTUBE ASSEMBLY, 204/205/210/212/214, UH-1H, UH-1A/B/E/F/L/P, TH-1F/L, HH-1K HIGH AFT
3			1	D412-664-243	CROSSTUBE ASSEMBLY, 412 HIGH AFT
10	2			* D2893-1	SUPPORT
11	4			* D3595-063-450	RUBBER CUSHION
12	4			* MS21920-25	CLAMP (OR MS21042-26)
13	4			AN6-35A	BOLT
14	4			AN6-36A	BOLT
15	6			-MS21042L6	NUT (OR MS21042-6)
16	18			AN960JD616	WASHER
20	2			* D2940-1	SUPPORT
21	4			* D3595-063-530	RUBBER CUSHION
22	4			* MS21920-28	CLAMP (OR MS21042-30)
23	4			AN6-40A	BOLT
24	2			AN6-41A	BOLT
25	6			MS21042L6	NUT (OR MS21042-6)
26	18			AN960JD616	WASHER
30		1		* D2896-1	SUPPORT
32		2		* D3595-063-570	RUBBER CUSHION
33		4		* MS21920-28	CLAMP
34		2		* MS21920-30	CLAMP (OR MS21042-32)
35		4		AN6-40A	BOLT
36		2		AN6-41A	BOLT
37		6		MS21042L6	NUT (OR MS21042-6)
38		18		AN960JD616	WASHER
39		2		* D3189-1	CHAFING SHIELD
50	1	1		D3428-1	PLACARD

*REFERENCE ONLY. PARTS ARE INCLUDED IN D212-664-141/-241 OR D412-664-243 ASSEMBLIES ABOVE
 NOTE: KITS INCLUDE EXTRA HARDWARE FOR COMPATIBILITY WITH BOTH DART AND BELL/AI
 SKIDTUBES.